Trend Study 21-9-03

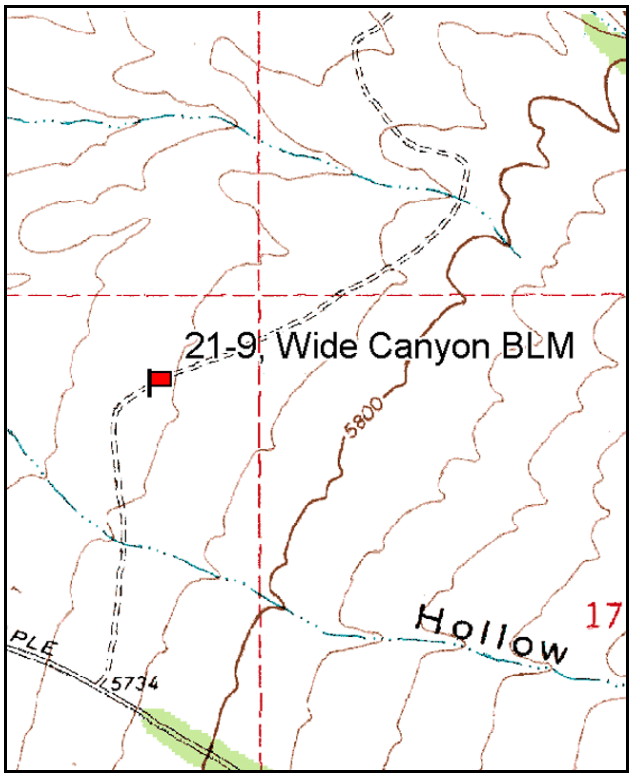
Study site name: Wide Canyon BLM . Vegetation type: Cliffrose Chaining .

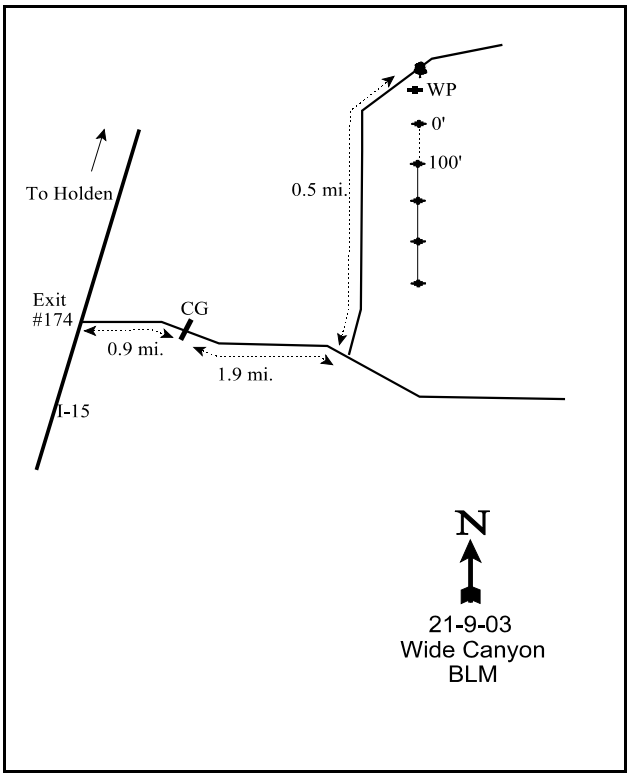
Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 4 on 4ft.

LOCATION DESCRIPTION

From exit #174 on I-15 south of Holden, go 0.9 miles east to a cattleguard. Continue 1.9 miles to a dirt road turning off to the left. Follow this dirt road 0.5 miles to a witness post (rebar) 3 feet off the right side of the road, about 10 feet beyond a juniper. The frequency baseline starts 100 feet south of the witness post. The 0-foot stake is rebar with browse tag #7107 attached.





Map Name: Coffee Peak

Diagrammatic Sketch

Township 20S , Range 3W , Section 18

GPS: NAD 27, UTM 12S 4326073 N, 394091 E

DISCUSSION

Wide Canyon BLM - Trend Study No. 21-9

This study samples important deer winter range managed by the BLM in the Maple Hollow and Wide Canyon area. The study slopes slightly (2-5%) to the west at an elevation of 5,700 feet. An extensive area of this relatively flat bench was chained in the 1960's and is now dominated by Wyoming big sagebrush and Stansbury cliffrose. Wildlife use, primarily by wintering mule deer, has been moderate to heavy over the years. An old DWR pellet group transect near this site estimated 87 deer days use/acre (215 ddu/ha) from 1981-85 (Jense et al. 1985). Between 1986 and 1991, deer use increased to 95 days use/acre (235 ddu/ha) (Jense et al 1991). A pellet group transect read along the study site baseline estimated 155 deer days use/acre (383 ddu/ha) in 1998 and 167 deer days use/acre (413 ddu/ha) in 2003. Cattle use has been light at an estimated 12 cow days use/acre (30 cdu/ha) in 1998 and 2 cow days use/acre (5 cdu/ha) in 2003. Cattle pats in both years were from the previous grazing season. Although not documented in the pellet group transect in 1998 or 2003, livestock use appeared very heavy on this BLM land when compared to Division land during earlier readings.

Soils on the site are very rocky, sandy, and shallow. There appears to be a hardpan at a depth of about 12 inches. Effective rooting depth was estimated at only about 6 inches. The hardpan is likely not a rooting barrier due to the presence of deeper rooted shrubs like cliffrose. Soils are sandy loam in texture and have a neutral pH (6.9). Soil temperature was extremely high in 1998 averaging 89.6°F at a depth of almost 7 inches. Average temperature was much lower in 2003 at 55.2°F. The difference in soil temperature between years is primarily due to the time of sampling and soil moisture. This study was read earlier in the season in 2003 compared to 1998. Soil moisture would be much higher earlier in the season on this lower elevation site with shallow, rocky soils resulting in lower soil temperatures. In 1985 and 1991, a good amount of litter was found under the vegetation. However, soil cover was disjointed between shrubs resulting in 24% and 32% of the surface being bare soil in 1985 and 1991. Bare ground cover was lower in 1998 and 2003 primarily due to increased cheatgrass cover in the shrub interspaces. Several years of below normal spring precipitation in the Fillmore area also resulted in less litter cover on this site in 2003. Soil movement has occurred on trails and shrub interspaces, but is minimized because of the level terrain. An erosion condition class assessment gave soils a stable rating in 2003.

The key browse species are Wyoming big sagebrush and Stansbury cliffrose. Sagebrush is the most abundant shrub with an estimated density of 2,400 plants/acre in 1998 and 1,900 plants/acre in 2003. The population decline in 2003 was due to the decrease in the number of young plants. Young plants were abundant in 1998 (620 plants/acre) but few in 2003 (60 plants/acre). Big sagebrush displayed light to moderate use from 1985-1998, with utilization increasing to a moderate-heavy level in 2003. Percent decadence remained about the same in 1998 and 2003. Vigor has been mostly normal throughout the population during all readings. Annual sagebrush leaders averaged 2 inches of growth when the site was read in May 2003.

Cliffrose is important on this site because of it's preference displayed by deer. However, it only contributed to 30% of the browse cover in 2003. Cliffrose displayed light to moderate hedging from 1985-1998, with heavy use increasing to 50% in 2003. The cliffrose are vigorous and healthy with no decadent plants being sampled since 1991. Density estimates were much lower in 1998 and 2003 compared to the first 2 readings due to the larger, more representative sample used post-1992. Young recruitment of cliffrose was good in 1985 with 20% of the population consisting of young plants. However, no young were sampled in either 1998 or 2003. The cliffrose population is starting to become unavailable to animals as mature plants average almost 7 feet in height. Cliffrose had moderate flowering in 2003. Low reproduction in the Wyoming big sagebrush and cliffrose populations is not surprising due to the abundance of cheatgrass in 1998 and 2003. Drier than normal spring precipitation in the Fillmore area for several years preceding the 2003 reading is also a

contributing factor.

Juniper density was estimated at 22 trees/acre in 2003. Juniper does not seem to be increasing on the site as 1998 density estimates were slightly higher. Juniper overhead canopy cover averaged 6% in 1998 and 2003. Broom snakeweed was very abundant in 1998, but the population decreased by 96% in 2003 with the drier conditions.

The herbaceous understory is in poor condition with weedy annuals being the dominant forms. The frequency of perennial grasses is low and perennial forbs are almost nonexistent. Sandberg bluegrass has been the only abundant perennial species in any year. Sandberg bluegrass showed significant increases in nested frequency and average cover in 2003 which is a positive sign. Cheatgrass was the dominant species in both 1998 and 2003. Storksbill, an annual forb, was also abundant in 2003. Cheatgrass showed a significant decline in nested frequency in 2003, but it increased in average cover and was still sampled in 98% of the quadrats. With the exception of Sandberg bluegrass, most of the herbaceous perennial plants on this site occur under the protection of shrubs. During past readings, most of the grasses appeared to have been heavily utilized and vigor was very poor except for those individuals under the protection of sagebrush crowns.

1985 APPARENT TREND ASSESSMENT

Soil trend appears essentially stable with low levels of erosion. Vegetative trend appears stable to declining as the key species compete with increasers. As far as deer winter range is concerned, the site provides good browse. However, herbaceous vegetation is severely depleted. An increase in perennial grasses and forbs would be desirable in terms of ground cover and soil protection, as well as diversity and total production of forage for livestock use. It probably will not improve significantly without reductions in grazing and/or seeding.

1991 TREND ASSESSMENT

Basic cover features have experienced two major downward trends: a decrease in litter cover and an increase in percent bare ground. Vegetative basal cover remains low and basically unchanged at 2%. These changes can most likely be attributed to the extended drought we have been experiencing since 1985. Trend for soil is slightly down. The key browse species, Wyoming big sagebrush and cliffrose show a stable trend with the exception of poor recruitment for cliffrose, which is not as critical because of its characteristics of a long life. Broom snakeweed is increasing. The trend for browse is stable. The herbaceous understory trend is stable, but still in poor condition because of poor species diversity and abundance of the annuals, cheatgrass and bur buttercup.

TREND ASSESSMENT
soil - slightly down (2)
browse - stable (3)
herbaceous understory - stable (3)

1998 TREND ASSESSMENT

Trend for soil is up with a decline in percent bare ground from 32% to 9%. The negative aspect to the decline in bare soil is that it results from an increase in cheatgrass cover. Litter cover has remained at similar levels while rock/pavement cover have doubled from 6% to 12%. Erosion is not currently a problem. Trend for browse is mixed. Wyoming big sagebrush appears to have a slightly upward trend due to improved recruitment, good vigor, light to moderate use, and relatively low decadence. Stansbury cliffrose appears to have a slightly downward trend due to the increasing height of mature plants and lack of recruitment. Due to

the lack of large numbers of dead plants, the dramatic change in density since 1991 (865 plants/acre to 180) is mostly due to the much larger sample used in 1998 which better estimates shrub populations. Trend for browse is considered stable since sagebrush provides 45% of the browse cover (73% of the preferred browse) on the site and cliffrose only 17%. Trend for the herbaceous understory is stable but remains in very poor condition. Cheatgrass and annual forbs dominate the site by providing 85% of the total herbaceous cover. Perennial grasses are depleted and growing mostly within the protection of shrub crowns.

TREND ASSESSMENT
soil - up (5)
browse - stable (3)
herbaceous understory - stable (3)

2003 TREND ASSESSMENT

Trend for soil is stable even with a large decrease in litter cover. Vegetation cover increased and bare soil only slightly increased with the large reduction of litter cover. Soils show little evidence of erosion. Trend for browse is slightly down. Wyoming big sagebrush decreased in density due to the loss of most of the young age class from the population in 2003. Vigor remains normal for most of the population and percent decadence is stable. Use on big sagebrush increased to a heavier level compared to 1998. Cliffrose density remains stable, but low. Use on cliffrose increased in 2003, but vigor is normal throughout the population and no decadent plants were sampled. The abundance of highly competitive annuals in the understory will make reproduction of sagebrush and cliffrose difficult in the future. Trend for the herbaceous understory is stable, although composition remains weedy and annuals are dominant, primarily cheatgrass. Sandberg bluegrass significantly increased in nested frequency in 2003, but crested wheatgrass and bottlebrush squirreltail both significantly declined. Perennial forbs remain sparse.

TREND ASSESSMENT
soil - stable (3)
browse - slightly down (2)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Management unit 21 , Study no: 9

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
G	Agropyron cristatum	$_{ab}$19	$_{b}$36	$_{ab}$24	$_{a}$8	.90	.26
G	Bromus tectorum (a)	-	-	$_{b}$370	$_{a}$329	15.22	19.06
G	Carex spp.	-	-	-	3	-	.15
G	Poa bulbosa	$_{a}$-	$_{a}$-	$_{a}$3	$_{b}$29	.00	.83
G	Poa secunda	$_{a}$130	$_{a}$114	$_{a}$102	$_{b}$198	1.32	7.09
G	Sitanion hystrix	$_{b}$11	$_{bc}$15	$_{c}$34	$_{a}$-	.39	-
Total for Annual Grasses		0	0	370	329	15.22	19.06
Total for Perennial Grasses		160	165	163	238	2.63	8.34
Total for Grasses		160	165	533	567	17.85	27.40

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
F	Agoseris glauca	-	8	-	5	-	.03
F	Alyssum alyssoides (a)	-	-	-	5	-	.18
F	Astragalus spp.	-	-	3	-	.15	-
F	Calochortus nuttallii	-	4	-	5	-	.01
F	Chenopodium spp. (a)	-	-	2	-	.00	-
F	Collinsia parviflora (a)	-	-	34	31	.18	.14
F	Descurainia pinnata (a)	-	-	-	1	-	.00
F	Erodium cicutarium (a)	-	-	$_{a}$25	$_{b}$217	.12	11.55
F	Lactuca serriola	$_{a}$-	$_{b}$10	$_{a}$-	$_{ab}$3	-	.03
F	Lepidium spp. (a)	-	-	$_{b}$218	$_{a}$-	1.14	-
F	Microsteris gracilis (a)	-	-	$_{b}$18	$_{a}$5	.07	.01
F	Montia perfoliata (a)	-	-	$_{a}$-	$_{b}$19	-	.07
F	Phacelia spp.	-	-	-	8	-	.04
F	Phlox longifolia	-	1	-	3	-	.00
F	Ranunculus testiculatus (a)	-	-	$_{b}$26	$_{a}$9	.06	.02
F	Tragopogon dubius	-	1	2	-	.00	-
F	Zigadenus paniculatus	-	-	-	1	.00	.00
Total for Annual Forbs		0	0	323	287	1.59	11.98
Total for Perennial Forbs		0	24	5	25	0.16	0.12
Total for Forbs		0	24	328	312	1.75	12.10

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 21 , Study no: 9

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Artemisia tridentata wyomingensis	68	63	9.60	13.78
B	Chrysothamnus nauseosus hololeucus	6	4	.56	.00
B	Cowania mexicana stansburiana	8	8	3.72	6.86
B	Gutierrezia sarothrae	60	8	6.02	.06
B	Juniperus osteosperma	3	3	1.54	2.34
B	Opuntia spp.	1	1	.00	-
B	Purshia tridentata	0	0	.03	-
Total for Browse		146	87	21.49	23.06

CANOPY COVER, LINE INTERCEPT --
Management unit 21 , Study no: 9

Species	Percent Cover	
	'98	'03
Artemisia tridentata wyomingensis	-	10.00
Chrysothamnus nauseosus hololeucus	-	.35
Cowania mexicana stansburiana	-	11.53
Juniperus osteosperma	6.00	5.86
Opuntia spp.	-	.13

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 21 , Study no: 9

Species	Average leader growth (in)
	'03
Artemisia tridentata wyomingensis	2.0

POINT-QUARTER TREE DATA --
Management unit 21 , Study no: 9

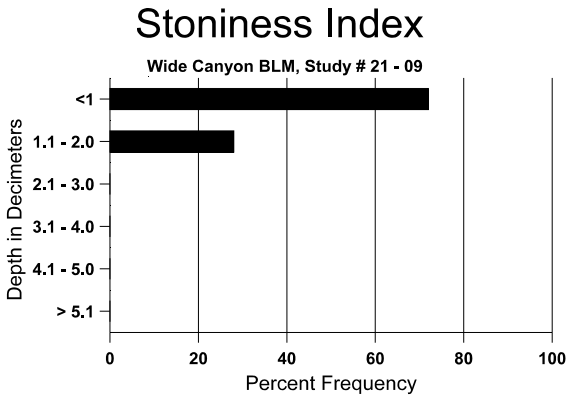
Species	Trees per Acre		Average diameter (in)	
	'98	'03	'98	'03
Cowania mexicana stansburiana	N/A	152	N/A	4.1
Juniperus osteosperma	33	22	7.4	6.2

BASIC COVER --
Management unit 21 , Study no: 9

Cover Type	Average Cover %			
	'85	'91	'98	'03
Vegetation	2.50	2.00	48.18	58.09
Rock	4.75	5.50	10.57	10.47
Pavement	.50	.25	1.12	.21
Litter	68.00	59.25	56.50	34.65
Cryptogams	.25	.75	2.17	1.46
Bare Ground	24.00	32.25	9.02	16.09

SOIL ANALYSIS DATA --
Management unit 21, Study no: 9, Study Name: Wide Canyon BLM

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
5.8	55.2 (13.1)	6.9	56.7	25.7	17.6	2.9	18.4	163.2	0.7



PELLET GROUP DATA --
Management unit 21 , Study no: 9

Type	Quadrat Frequency	
	'98	'03
Rabbit	22	22
Elk	-	1
Deer	60	58
Cattle	1	5

Days use per acre (ha)	
'98	'03
-	-
-	-
155 (383)	167 (413)
12 (30)	2 (5)

BROWSE CHARACTERISTICS --
Management unit 21 , Study no: 9

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis											
85	**1400**	-	400	800	200	-	5	0	14	0	30/33
91	**1399**	-	266	1000	133	-	38	0	10	5	29/50
98	**2400**	60	620	1240	540	540	23	0	23	6	31/39
03	**1900**	-	60	1360	480	460	35	25	25	13	28/36

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Chrysothamnus nauseosus hololeucus											
85	**0**	-	-	-	-	-	0	0	0	0	-/-
91	**0**	-	-	-	-	-	0	0	0	0	-/-
98	**140**	-	-	120	20	-	14	0	14	0	29/43
03	**80**	-	-	60	20	40	0	75	25	0	20/26
Cowania mexicana stansburiana											
85	**999**	-	200	666	133	-	73	7	13	0	48/49
91	**865**	-	66	666	133	-	54	0	15	0	56/58
98	**180**	-	-	180	-	40	33	0	0	0	83/91
03	**160**	-	-	160	-	-	25	50	0	0	82/89
Gutierrezia sarothrae											
85	**1332**	-	666	600	66	-	0	5	5	5	10/13
91	**2266**	-	600	1666	-	-	0	0	0	0	13/16
98	**5720**	-	100	5620	-	-	0	0	0	0	13/17
03	**220**	-	20	200	-	-	0	0	0	0	5/5
Juniperus osteosperma											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**60**	-	-	60	-	20	0	0	-	0	-/-
03	**60**	-	-	60	-	20	0	0	-	0	-/-
Opuntia spp.											
85	**200**	-	-	200	-	-	0	0	0	0	6/8
91	**132**	-	-	66	66	-	0	0	50	0	8/15
98	**20**	20	-	20	-	-	0	0	0	0	6/12
03	**20**	-	-	20	-	-	0	0	0	0	6/14
Purshia tridentata											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	91/93
03	**0**	-	-	-	-	-	0	0	-	0	-/-